NS:EPAPAO1 EPA Region 1 PRELIMINARY ASSESSMENT DECISION RECORD FY



DRSmith: 10-03-86

LIDENTIFICATION

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MAD 48 0 9 0 9 443

II. SITE NAME AND LOCATION O1 SITE NAME (Local common, or description name of site) 102 STREET, ROUTE NO., OR SPECIFIC LOCATION IDENTIFIER	コ
South Station (Foundation Fill Disposal) Summer STREET	<u></u>
By for MA 02/10	
DRAFT PAs completed by C FIT (F1) State Site 18 No. C Existing File BY	. <u>.</u>
DRAFT PRIORITY ASSESSMENT/RECOMMENDATION FOR SITE INSPECTION O High O Medium O Low None SUMMARY OF COMMENTS ON DRAFT	N
a. STATE comments, dated by	
Sussary	ų
b. SITE CHNER comments, dated by	
C. EPA REGION 1 comments, dated by by	
G comments, dated by	3
FINAL PA DECISION BY EPA PA COORDINATOR: a. a. agree with draft. b. Revised draft. Reason	
c. Final Priority Assessment/Recommendation for Site Inspection O High O Medium O Low None d. Final decision made by Author Site Inspection Date 1/2/8	
CERCLIS INFORMATIONS a. Site Discovery Date (If not already in CERCLIS) (If not already in CERCLIS)	7
a. Site Discovery Date (If not already in CERCLIS) b. PA Start Date ; Compl. Date (2/23/87 & FYAP Quarter 0 3 3	4



The Commonwealth of Massachusetts Department of Environmental Quality Engineering Metropolitan Boston = Northeast Region 5 Commonwealth Avenue Woburn, Massachusetts 01801

MEMORANDUM

TO: Helen Waldorf, DHW, Boston

THROUGH: Stephen Johnson, DHW, NERO

FROM: Patricia Rodden, DHW, NERO

DATE: December 1, 1987

SUBJECT: BOSTON - SOUTH STATION Preliminary Assessment

This Preliminary Assessment report has been prepared by a representative of the Massachusetts Department of Environmental Quality Engineering, (the Department) in partial fulfillment of obligations to the Environmental Protection Agency under the Multisite Cooperative Agreement.

SITE DESCRIPTION

South Station is an active railroad station located on Summer Street in Boston, Massachusetts. The site is bordered by Atlantic Avenue to the west, the rail yard to the south, and Dorchester Avenue and Fort Point Channel to the east. (Please refer to the site locus map, Figure 1.) The Massachusetts Bay Transit Authority (MBTA) is the current owner of the site and railroad operation.

HISTORY OF THE SITE

South Station has been a railway station since January 1, 1899. The station is presently a commuting center. The lines are not used for freight or industrial purposes. In the past, freight packages were shipped through the station. Mr. Jim Wright of the MBTA stated th did not think hazardous materials were ever transported through the station.

The Department's involvement with the site began as the result of a South Station expansion project. The MBTA was planning to build hotel and office space. In order to do so, a significant volume of contaminated soil had to be excavated and removed from the site. The Department

developed a guideline which the MBTA and their environmental consultant could follow to properly characterize and dispose of the excavated soil.

NATURE OF HAZARDOUS MATERIALS

South Station holds no licenses or permits for the generation, treatment or disposal of hazardous wastes. However, the presence of hazardous materials, PAHs, has been documented on-site. This contamination is thought to be from the train operation on-site.

HAZARDOUS CONDITIONS, INCIDENTS, PERMIT VIOLATIONS

At the commencement of the South Station expansion project in 1985, the Department required the MBTA to hire an environmental consultant to properly characterize the soil that was to be removed. The soil samples were analyzed for priority pollutant volatile organic compounds (VOCs), acid extractable compounds, base/neutral extractable compounds, pesticides, herbicides and polychlorinated biphenyls (PCBs).

Base/neutral compounds, particularly polynuclear aromatic hydrocarbons (PAHs) were found to be the major contaminants in the soil. Copies of all laboratory data sheets in Departmental files are contained in the Appendix of this report. PAHs are associated with waste oil and are often formed as the result of the product of incomplete combustion of organic compounds. The samples with the highest levels of PAHs were collected near the bumper area of the tracks where the trains are left to idle. The contaminant concentrations were found to decrease with depth from the surface and with distance from the bumper. Due to the nature of the contaminants and their distribution, the source of the contamination is thought to be train operation, leaking oil and run-off.

As mentioned previously, the Department developed a guideline with regard to the disposal of PAH contaminated soil in response to this situation. At the time, it was thought the levels of contamination did not warrant any special attention and consequently soil containing less than 500 mg/kg PAHs was classified as solid waste. This policy is currently under review and may be amended. Limited aeration was allowed for VOC contaminated soil prior to landfill disposal.

POSSIBLE ROUTES FOR CONTAMINATION

There is no documentation of groundwater contamination on the site. PAHs, the most common contaminant on-site, are not highly volatile, nor are they highly soluble in water. Therefore, the contaminants present are not likely to migrate far from their location of deposition. It is possible that limited dispersion of the contamination via windblown soil, or erosion due to surface water run-off may occur.

POSSIBLE AFFECTED POPULATIONS, RESOURCES

There are no municipal or private drinking water supplies in the vicinity of South Station. The City of Boston is provided water from the Quabbin Reservoir, located in west-central Massachusetts and under the jurisdiction of the Massachusetts Water Resources Authority. Fort Point Channel, which flows into Boston Harbor, is located in close proximity. However, as mentioned previously, the extent and nature of the contamination is such that the only possible route of migration to the channel would be via erosion due to surface water run-off or windblown soil. It is unlikely that an appreciable amount of contamination from the South Station site would reach the channel.

There is potential for direct human contact for employees at the railyard and workers undertaking the excavation and removal of contaminated soils. Adequate health and safety precautions should be taken by persons coming in contact with the contaminated soils.

CONCLUSIONS/RECOMMENDATIONS

South Station is an active railroad. Consequently, small amounts of contamination related to daily operations of the yard are likely to be present in areas of train operation. The Department's involvement to date has been limited to providing the MBTA direction in the disposal of the oil/PAH contaminated soil removed as part of the construction project. As the EPA does not regulate oil or oil contaminated soil which constitutes the majority of the contamination at the South Station site, the writer recommends no further action at the subject site is warranted under CERCLA.

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POTENTIAL HAZARDOUS WASTE SITE

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Boston	4.	. MA	02116	(617) 722-	5000		
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Patricia Rodden	DEOE	DHW		617, 935		211	87

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POTENTIAL HAZARDOUS WASTE SITE

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POTENTIAL HAZARDOUS WASTE SITE PRELIMINARY ASSESSMENT

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POTENTIAL HAZARDOUS WASTE SITE PRELIMINARY ASSESSMENT

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PART 3 - DESCRIPTION OF HAZARDOUS CONDITIONS AND INCIDENTS

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DEOE files, Northeast Regi	ional Office, Woburn Mass.		
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The Commonwealth of Massachusetts Department of Environmental Quality Engineering Metropolitan Boston - Northeast Region 5 Commonwealth Strenue

Woburn, Massachusetts 01801

April 16, 1985

RECEIVED

APR 1 7 1985

Mr. Stephen J. Barlow J.F. White Co. P.O. Box 240 Newtonville, MA 02160

J. F. WHITE.

Dear Mr. Barlow:

As per your letter of April 4, 1985, it is the Department's position that all surplus excavation material to be disposed of from the South Station construction project is to be classified as solid waste and removed to an approved sanitary landfill due to residual PAH contamination and the suspect nature of the site. Such disposal shall be in conformance with the stipulations of our previous correspondence regarding notification of local Boards of Health.

Very truly yours,

Richard J. Chalpin

Acting Regional

Environmental Engineer

Charle J. Chagi

RJC/ae

cc: Peter McNulty, MSTA

Assistant Director of Construction

--- 10 Park Plaza

Boston, MA 02116



GEOTECHNICAL ENGINEERS INC.

1017 MAIN STREET - WINCHESTER - MASSACHUSETTS 01890 (617) 729-1625

PRINCIPALS
RONALD C. HIRSCHFELD
STEVE J. POULOS
OANIEL P. LA-GATTA
RICHARO F. MURCOCX
, GONZALO CASTRO

September 19, 1984 Project 84291

Mr. Steve Barlow
J.F. White Contracting Co.
One Gateway Center
Newton, MA 02158

Subject:

Base/Neutral Compounds in Soil Samples Collected at South Station Intermodal Transportation Center

Dear Steve:

Please find attached a sketch of the South Station Trackyard, showing the approximate locations of test borings advanced to obtain soil for chemical analysis.

Soil obtained from each boring was analyzed for priority pollutant volatile organic compounds, acid organic compounds, base/neutral compounds, pesticides, herbicides & PCB'S. In addition, samples were analyzed using the EP Toxicity method to evaluate metal concentration in leachate which could be generated by soil at South Station.

Laboratory analysis of the soil reveals that all samples are free of any priority pollutant compounds except base/neutral compounds.

The total concentration (in parts per million [ppm]) of Base/Neutral Compounds in each sample is as follows:

B-1	191.47		
B-2	26.35	Track	7
B-3	2.2		
B-4	229.47]		
8-5	1.03}	Track	11
B-6	88.93)		•
B-7	ן 155.67		
B-3	1.25}	Track	17
B-3,	1.49]		



The Commonwealth of Massachusetts Lipartment of Environmental Quality Engineering

Mr. Steve Barlow

September 19, 1984

Page 2

Base/Neutral compounds include a group of chemicals referred to as polynuclear aromatic hydrocarbons (PAH's). These compounds are present in the by-products of fossil fuel combustion and may comprise up to 10% of diesel fuel or other petroleum distillates. The greatest concentration of PAH's was detected in samples obtained near the bumper of the tracks sampled (samples B-1, B-4, and B-7). This is probably the result of runoff or leaks of fuel from locomotives which idle near the bumper.

If you have any additional questions regarding the analytical data collected by GEI, please do not hesitate to call.

Very truly yours,

GEOTECHNICAL ENGINEERS INC.

Margret W. Hanley

Geologist

Richard F Wherdock

Richard F. Murdock, P.E. (Principal

MMH/RFM/alm attachment



ANTHONY D. CORTESE, Se.D.

Commissioner
727-5194

935-2160

The Commonwealth of Massachusetts Department of Emiconmental Quality Engineering

Meterpolitum Beston Northeast Region

323. Vin Boston Steel, Webuen M. 101801

September 10, 1984

Mr. Stephen J. Barlow
J.F. White Contracting Company
One Gateway Center
Newton Center
Newton, MA 02160

RE: MBTA South Station

Project Soil Classification and.

Aeracion Approval

Dear Mr. Barlow:

I have reviewed the most recent submittals from you and your consultants, Geotechnical Engineers, Inc. regarding analyses of a second round of samples from the South Station project.

All at the analytical data collected supports the decision that soil leaving South Station containing residual concentrations of polynuclear aromatic hydrocarbon (PAH's) may be classified as solid waste. In addition soils from South Station which contain less than 10 ppm of Volatile Organics may be classified as solid waste. Proper disposal options for these soils include:

- 1. Disposal of a site specifically established for this solid waste which has been assigned pursuant to M.G.L. Chapter 111, Section 150A, and approved by the Department in accordance with 310 CR 19.00. The "Regulations for the Disposal of Solid Wastes by Sanitary Landfill".
- 2. Disposal at an existing approved landfill under the conditions that the material is used as a daily cover material in an area that will again be covered the next day during the normal operation of the landfill. Due to these handling requirements, the material is subject to 310 CMR 19.16 of the "Regulations for Disposal of Solid Waste by Sanitary Landfill". Such special disposal requires the permission of the local assigning agency which is usually the Board of Health of the community where the disposal is to occur.
- 3. Incorporation in the proper closure of an existing approved landfill under the conditions that it is covered with a proper final cover as prescribed in a DECE approved closure plan.

Mr. Stephen J. Barlow September 10, 1984 Page 2.

In addition, I concur with the proposal to aerate soils at South Station which exhibit Volatile Organic Carbon concentrations between 10 and 100 ppm. The renovation area must be monitored a suitable distance downwind to ensure that ambient air quality is not adversely impacted by this operation.

Please call if you have any questions.

Hery truly yours,

Richard J. Chalpin

Acting Regional Environmental Engineer

RJC/gg

cc: Dr. Helina Brown
DEQE
One Winter St.
Boston, MA 02108



GEOTECHNICAL ENGINEERS INC.

IOI7 MAIN STREET - WINCHESTER - MASSACHUSETTS 01890 '617: 729-1628

PRINCIPALS
FONALD CHIRSCHFELD
STEVE I POULCS
CANIEL P LA GATTA
RICHARD F. MURDOCK
GONZALO CASTRO

October 19, 1984 Project 84291

ı:

RECEIVED

OCT 20 1984

Mr. Steve Barlow
J.F. White Contracting Co.
One Gateway Center
Newton, MA 02158

J. F. WHITE

Dear Steve:

Please find attached the results of chemical analysis of six surficial soil samples collected at the South Station Intermodal Transportation Center excavation site on September 24, 1984. The approximate location of each soil sample collected by Geotechnical Engineers Inc. (GEI) is shown in figure 1.

Soil samples were analyzed for US EPA Priority Pollutant Base/Neutral Organic Compounds by ERCO Inc. in Cambridge, Massachusetts. All samples were determined to contain measurable concentrations of various Base/Neutral Compounds.

All concentrations were reported by ERCO to be less than the average reporting limit (the smallest concentration which can be quantified) which varied for each sample. Table 1 summarizes the reporting limit for each sample, the Base/Neutral Compounds detected, and the maximum concentration of Base/Neutral Compounds which could be present.

The greatest concentration of Base/Neutral Compounds were detected in sample #1, at 1,350 parts per million (pcm). This concentration, although high, is less than the concentration of Base/Neutral Compounds which is expected to be present in soil saturated with 3% diesel fuel. (DEQE currently permits soil contaminated with up to 3% petroleum fuel products to be used as daily cover on state approved landfills.)

In previous sampling rounds at South Station, soil collected in areas proximate to the Station and rail bumpers, where trains idle, exhibited the greatest concentrations of Base/Neutral Compounds. Concentrations of Base/Neutral Compounds generally decrease to the south of the head house.

Concentration of Base/Neutral Compounds in soil collected on September 9, 1984 by GEI are greater than concentrations detected in samples collected previously. This is probably because soil samples described here represent conditions in surficial soil, which is most likely to be contaminated with petroleum fuel products. (Surficial soil will act in part as an adsorbent to fuels spilled in the ground surface.) In general, total concentrations of Base/Neutral Compounds should decrease with depth.

If you have any questions regarding the soil analysis data presented in this letter, please do not hesitate to call.

Very truly yours,

GEOTECHNICAL ENGINEERS INC.

Th. Macgret Flaul
Margret M. Hanley

Geologist

Richard F. Murdock, P.E.

Principal

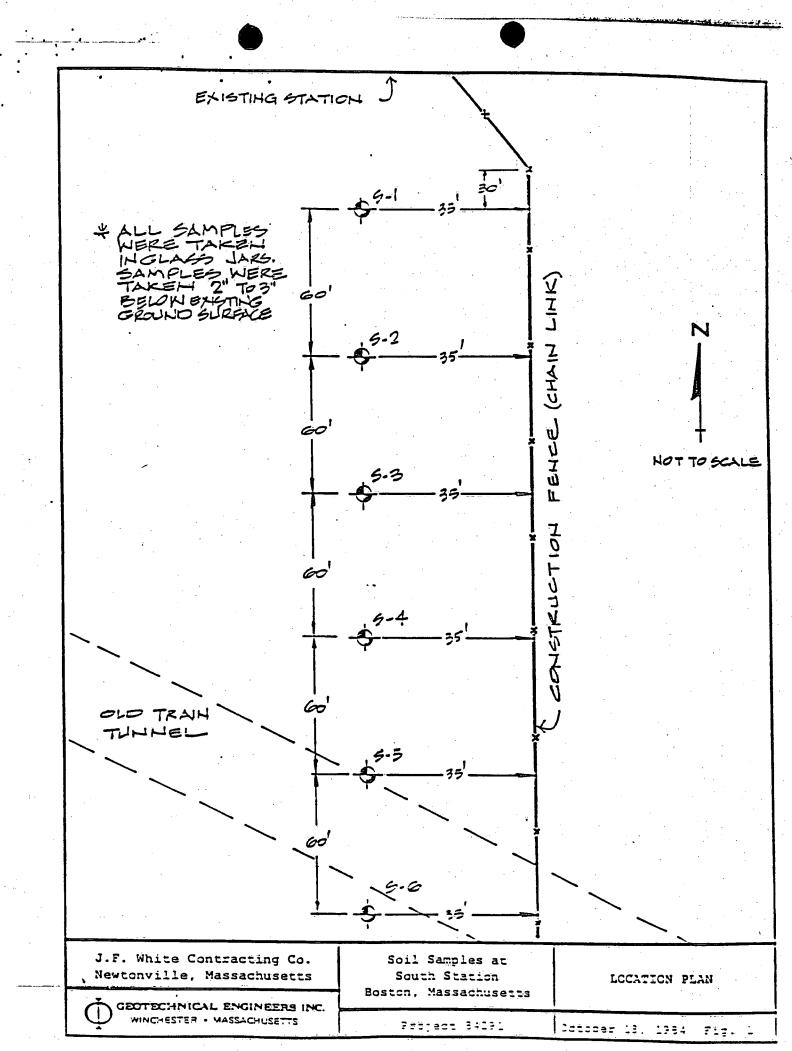
MMH/RFM/alm attachments

TABLE 1

SUMMARY OF BASE/NEUTRAL ORGANIC ANALYSIS SOIL SAMPLES COLLECTED AT SOUTH STATION INTERMODAL TRANSPORTATION CENTER, BOSTON, MASSACHUSETTS

September 24, 1984

		•		
Sample #	Reporting Limit (ppb)	Base/Neutral Compounds Detected	Concentr (in ppm)	Possible ation of Base/Compounds
1	270,000	Fluoranthene bis (2-ethylhexyl)- pthalate	1,350	mqq
		<pre>di-n-butyl phthalate di-n-octyl phthalate pyrene</pre>		
2	100,000	Fluoranthene pyrene	200	bow
3	290,000	Fluoranthene phenanthrene pyrene	870	ppm
4	47,000	Fluoranthene benzo(a) anthracene benzo(a) pyrene benzo(k) fluoranthene chrysene benzo(ghi) perylene phenanthrene pyrene		ppm
5	180,000	Fluoranthene phenanthrene pyrene	540	bōw
6	25,000	Fluoranthene benzo(a) anthracene benzo(a) pyrene benzo(k) fluoranthene chrysene		mgg
		anthracene benzo(ghi) perylene phenanthene indeno (1,2,3-cd)- pyrane		
4. 2		cvrene		



CLIENT	GEI
CLIENT ID	Sample #1
ERCO ID	13-7711 BN
SAMPLE RECEIVED	9/21/84
ANALYSIS COMPLETED	10/10/84
RESULTS IN	ug/kg(ppb)

ERCO / ENERGY RESOURCES CO. INC.

ORGANIC PRICRITY POLLUTANT ANALYSIS

BASE/NEUTRAL COMPOUNDS

	ND = None detected	······································		<u>-:</u>	
568	nitrobenzene	ND		p-dioxin	NC
558	naphthalene	ND	1298		
54B	isophorone	· ND	84B	pyrene	1
53B	hexachlorocyclopentadiene	ΝĎ	83B	indeno(1,2,3-cd)pyrene	NC
52B	hexachlorobutadiene	ND	82B	dibenzo(a,h)anthracene	NC
43B	bis(2-chloroethoxy)methane	ND	81B	phenanthrene	NC
428	bis(2-chloroisopropyl)ether	ND	8ÖB	fluorene	NE
418	4/bromophenyl phenyl ether	ND	798	benzo(ghi)perylene	NE
408	4-chlorophenyl phenyl ether	ND	78B	anthracene	NC
398	fluoranthene	*	77B	acenaphthylene	NÖ
37B	3	ND	763	chrysene	NC
368	2,6-dinitrotoluene	ND	758	benzo(k)fluoranthene	NE
358	2,4-dinitrotoluene	ND	748	3,4-benzofluoranthene	NC
288	3,3-dichlorobenzidine	ND	738	benzo(a)pyrene	NO
278	1,4-dichlorobenzene	ND	728	benzo(a)anthracene	NC
26B	1,3-dichlorobenzene	ND	71B	dimethyl phthalate	NE
258	1,2-dichlorobenzene	ND	70B	diethyl phthalate	NC
20B	2-chloronaphthalene	ND	69B		×
188	bis(2-chloroethyl)ether	ND	68B	di-n-butyl phthalate	×
128	hexachloroethane	ND	67B	butyl benzyl phthalate	ND
9B	hexachlorobenzene	ND	66B	bis(2-ethylhexyl)phthalate	4
88	1,2,4-trichlorobenzene	ND	63B	N-nitrosodi-n-propylamine	NC
58	benzidine	ND	62B	N-nitrosodiphenylamine	NI
18	acenaphthene	ND	61B	N-mitrosodimethylamine	NC

ND = None detected.

NA = Not applicable.

*Below reporting limit of 270,000 ppb.

Reported by: 4-

Checked by: GR

CLIENT	GEI	* * .	
CLIENT ID	Sample #2		
ERCO ID	13-7712		
SAMPLE RECEIVED	9/21/84		
ANALYSIS COMPLETED	10/9/84		
RESULTS IN	ug/kg(ppb)		

ERCO / ENERGY RESOURCES CO. INC.

CREANIC PRICRITY POLLUTANT ANALYSIS

BASE/NEUTRAL COMPOUNDS

18	acenaphthene	ND	618	N-nitrosodimethylamine		ND
58	benzidine	ND	62B	N-nitrosodiphenylamine		ND
3B	1,2,4-trichlorobenzene	ND	63B	N-nitrosodi-n-propylamine		ND
9 B	hexachlorobenzene	ND	66B	bis(2-ethylhexyl)phthalate		ND
12B	hexachloroethane	ND	67B	butyl benzyl phthalate	•	ND
88	bis(2-chloroethyl)ether	ND	688	di-n-butyl phthalate		ND
20B	2-chloronaphthalene	ND	69B	di-n-octyl phthalate		ND
25B	1,2-dichlorobenzene	ND	70B	diethyl phthalate		ND
268	1,3-dichlorobenzene	ND	71B	dimethyl phthalate	٠.	ND
27B	1,4-dichlorobenzene	ND	72B	benzo(a) anthracene		ND
28B	3,3-dichlorobenzidine	ND	73B	benzo(a)pyrene		ND
358	2,4-dinitrotoluene	ND	74B	3,4-benzofluoranthene		ND
368	2,6-dinitrotoluene	- ND	75B	benzo(k)fluoranthene		ND
37B	1,2-diphenylhydrazine	ND	768	chrysene		ND
39 <u>8</u>	fluoranthene	*	77B	acenaphthylene		ND
OB	4-chlorophenyl phenyl ether	ND	78B	anthracene		ND
18	4/bromophenyl phenyl ether	ND	79B	benzo(ghi)perylene	•	ND
12B	bis(2-chloroisopropyl)ether	ND	80B	fluorene		ND
43B	bis(2-chloroethoxy)methane	ND	818	phenanthrene		ND
52B	hexachlorobutadiene	ND	828	dibenzo(a,h)anthracene		ND
53B	hexachlorocyclopentadiene	ND	838	indeno(1,2,3-cd)pyrene		ND
54B	isophorone	NĎ	848	pyrene		*
558	naphthalene	ND	1298	••		
56B	nitrobenzene	ND		p-dioxin		ND

ND	=	None de	tected	above	the	aver	age
		reporti	ng lim	it of	100,0	00 p	pb.

Reported by: ____

NA = Not applicable.

*Trace concentrations detected below the average reporting limit.

CLIENT	GEI
CLIENT ID	Sample #3
ERCO ID	13-7713
SAMPLE RECEIVED	9/21/84
ANALYSIS COMPLETED	10/9/84
RESULTS IN	ug/kg(ppb)

ERCO / ENERGY RESOURCES CO. INC.

CRGANIC PRIGRITY POLLUTANT ANALYSIS

BASE/NEUTRAL COMPOUNDS

1B	acenaphthene	ND	61B	N-nitrosodimethylamine	ND
58	benzidine	ND	62B	N-nitrosodiphenylamine	ND
8B	1,2,4-trichlorobenzene	ND	63B	N-nitrosodi-n-propylamine	ND
9B	hexachlorobenzene	ND		bis(2-ethylhexyl)phthalate	ND
12B	hexachloroethane	ND	67B	butyl benzyl phthalate	ND
188	bis(2-chloroethyl)ether	ND	68B	di-n-butyl phthalate	ND
20B	2-chloronaphthalene	ND	69B	di-n-octyl phthalate	ND
25B	1,2-dichlorobenzene	ND	70B	diethyl phthalate	ND
268	1,3-dichlorobenzene	ND	718	dimethyl phthalate	_ ND
27B	1,4-dichlorobenzene	ND	72B	benzo(a) anthracene	ND
28B	3,3-dichlorobenzidine	ND	73 8	benzo(a)pyrene	ND
358	2,4-dinitrotoluene	ND	74B	3,4-benzofluoranthene	ND
368	2,6-dinitrotoluene	ND	75B	benzo(k)fluoranthene	ND
37B	1,2-diphenylhydrazine	ND	76B	chrysene	ND
39B	fluoranthene	*	77B	acenaphthylene	ND
40B	4-chlorophenyl phenyl ether	ND	78 B	anthracene	ND
41B	4/bromophenyl phenyl ether	ND	79B	benzo(ghi)perÿlene	ND.
42B	bis(2-chloroisopropyl)ether	ND	80B	fluorene	ND
43B	bis(2-chloroethoxy)methane	ND	818	phenanthrene	*
52B	hexachlorobutadiene	ND	82B	dibenzo(a,h)anthracene	ND
53B	hexachlorocyclopentadiene	ND	83B	indeno(1,2,3-cd)pyrene	ND
548	isophorone	ND	84B	pyrene	*
558	naphthalene	ND	129B	• •	
568	nitrobenzene	ND		p-dioxin	ND

ND = None detected above the average reporting limit of 290,000 ppb.

Reported by: Checked by:

AT UCL

NA = Not applicable.

*Trace concentrations detected below the average reporting limit.

CLIENT GEI

CLIENT ID Sample #4

ERCO ID 13-7714

SAMPLE RECEIVED 9/21/84

ANALYSIS COMPLETED 10/10/84 BASE/NEU

RESULTS IN ug/kg(ppb)

18 acenaphthene ND 61B N-nitrosodimethylar
58 benzidine ND 62B N-nitrosodiphenylar
88 1,2,4-trichlorobenzene ND 63B N-nitrosodi-n-prop.
98 hexachlorobenzene ND 66B bis(2-ethylhexyl)phanel ND 67B butyl benzyl phthalar
188 bis(2-chloroethyl)ether ND 68B di-n-butyl phthalar
208 2-chloronaphthalene ND 69B di-n-octyl phthalar

ERCO / ENERGY RESOURCES CO. INC.

CRGANIC PRICRITY POLLUTANT ANALYSIS

BASE/NEUTRAL COMPOUNDS

18	acenaphthene	ND	61B	N-nitrosodimethylamine	ND
5B	benzidine	ND	62B	N-nitrosodiphenylamine	ND
88	1,2,4-trichlorobenzene	ND	63B	N-nitrosodi-n-propylamine	•
9B	hexachlorobenzene	ND	66B	bis(2-ethylhexyl)phthalate	ND
12B_		ND	67B	butyl benzyl phthalate	ND
188	bis(2-chloroethyl)ether	ND	68B		ND
20B	2-chloronaphthalene	ND .		di-n-butyl phthalate	ND
25B	1,2-dichlorobenzene		69B	di-n-octyl phthalate	ND
268		ND	70B	diethyl phthalate	ND
27B		ND	71B	dimethyl phthalate	ND
	1,4-dichlorobenzene	ND	72B	benzo(a)anthracene	
288	3,3-dichlorobenzidine	ND	73B	benzo(a)pyrene	*
358	2,4-dinitrotoluene	ND	74B	3,4-benzofluoranthene	
368	2,6-dinitrotoluene	ND	758	benzo(k)fluoranthene	· (a)*
37B	1,2-diphenylhydrazine	ND	76B	chrysene	* j
398	fluoranthene	*	77B	acenaphthylene	ND
408	4-chlorophenyl phenyl ether	ND	78B	anthracene	ND
41B	4/bromophenyl phenyl ether	ND	79B	benzo(ghi)perylene	*
42B	bis(2-chloroisopropyl)ether	ND	808	fluorene	ND
43B	bis(2-chloroethoxy)methane	ND	81B	phenanthrene	***
52B	hexachlorobutadiene	ND	82B	dibenzo(a,h)anthracene	ND
538	hexachlorocyclopentadiene	ND	83B		
54B	isophorone	ND		indeno(1,2,3-cd)pyrene	ND
55B	naphthalene		84B	pyrene	F
		ND	129B		NO.
56B	nitrobenzene	ND		p-dioxin	ND

ND	=	None dete	cted al	ove	the i	average
		reporting	limit	of	47,000	o ppb.

NA = Not applicable.

Reported by: AT Checked by: WKG

(a) coelute

^{*}Trace concentrations detected below the average reporting limit.

CLIENT GEI

CLIENT ID Sample #5

ERCO ID 13-7715

SAMPLE RECEIVED 9/21/84

ANALYSIS COMPLETED 10/9/84

RESULTS IN ug/kg(ppb)

ERCO / ENERGY RESOURCES CO. INC.
ORGANIC PRIORITY POLLUTANT ANALYSIS

BASE/NEUTRAL COMPOUNDS

	· · · · · · · · · · · · · · · · · · ·				
18	acenaphthene	ЙD	61B	N-nitrosodimethylamine	ND
5B	benzidine	ND	62B	N-nitrosodiphenylamine	ND
8B	1,2,4-trichlorobenzene	ND	63B	N-nitrosodi-n-propylamine	ND
9B	hexachlorobenzene	ND	6 6B	bis(2-ethylhexyl)phthalate	DN
12B	hexachloroethane	ND	67B	butyl benzyl phthalate	ND
18B	bis(2-chloroethyl)ether	ND	6 88	di-n-butyl phthalate	ИD
20B	2-chloronaphthalene	ND	6 98	di-n-octyl phthalate	ND
25B	1,2-dichlorobenzene	ND	70B	diethyl phthalate	ND
26B	1,3-dichlorobenzene	ND	71B	dimethyl phthalate	ND
27B	1,4-dichlorobenzene	ND	72B	benzo(a)anthracene	ND
288	3,3-dichlorobenzidine	ND	73B	benzo(a)pyrene	ND
3 58	2,4-dinitrotoluene	ЙÔИ	748	3,4-benzofluoranthene	ND.
363	2,6-dinitrotoluene	ND	758	benzo(k)fluoranthene	ND
37B	1,2-diphenylhydrazine	ND	768	chrysene	ND.
39B	fluoranthene	×	77B	acenaphthylene	ND
40B	4-chlorophenyl phenyl ether	ND	78B	anthracene	ND
41B	4/bromophenyl phenyl ether	ND	79B	benzo(ghi)perylene	ND
42B	bis(2-chloroisopropyl)ether	ND	80B	fluorene	ND
43B	the state of the s	ND	81B	phenanthrene	*
52B	hexachlorobutadiene	ND	82B	dibenzo(a,h)anthracene	ND
53B	hexachlorocyclopentadiene	ND	83B	indeno(1,2,3-cd)pyrene	ND
54B	isophorone	ND	848	pyrene	*
558	naphthalene	ND	1298	•	
568	nitrobenzene	ND		p-dioxin	ND

ND = None detected above the average reporting limit of 180,000 ppb.

Reported by: ____ Checked by: ___

11.8

NA = Not applicable.

*Trace concentrations detected below the average reporting limit.

GEI CLIENT Sample #6 CLIENT ID 13-7716 ERCO ID 9/21/84 SAMPLE RECEIVED 10/11/84 ANALYSIS COMPLETED ua/ka(pob) RESULTS IN

ERCO / ENERGY RESOURCES CO. INC.

ORGANIC PRIGRITY POLLUTANT ANALYSIS

BASE/NEUTRAL COMPOUNDS

					
18	acenaphthene	ND	61B	N-nitrosodimethylamine	ND
5B	benzidine	ND	62B	N-nitrosodiphenylamine	ПD
88	1,2,4-trichlorobenzene	ND	63B	N-nitrosodi-n-propylamine	- ND
9B	hexachlorobenzene	ND	66B	bis(2-ethylhexyl)phthalate	ND
128	hexachloroethane	ND	67B	butyl benzyl phthalate	ND
188	bis(2-chloroethyl)ether	ND	68B	di-n-butyl phthalate	ND
20B	2-chloronaphthalene	ND	69B	di-n-octyl phthalate	ND
25B	1,2-dichlorobenzene	ND	70B	diethyl phthalate	ND
26B	1,3-dichlorobenzene	ND	71B	dimethyl phthalate	ND
27B	1,4-dichlorobenzene	ND	72B	benzo(a)anthracene	*
288	3,3-dichlorobenzidine	ND	73B	benzo(a)pyrene	*
3 58	2,4-dinitrotoluene	ND	748	3,4-benzofluoranthene	
368	2,6-dinitrotoluene	ND	758	benzo(k)fluoranthene	- (a)*
37B	•	ОИ	76B	chrysene	*
39B	fluoranthene	*	77B	acenaphthylene	ND
40B	4-chlorophenyl phenyl ether	ND	78B	anthracene	*
418	4/bromophenyl phenyl ether	ND	79B	benzo(ghi)perylene	*
42B	bis(2-chloroisopropyl)ether	ND		fluorene	· ND
43B	bis(2-chloroethoxy)methane	ND	81B	phenanthrene	*
528	hexachlorobutadiene	ND	82B	dibenzo(a,h)anthracene	NC
53B	hexachlorocyclopentadiene	ND	83B	indeno(1,2,3-cd)pyrene	*
54B	isophorone	ND	848	pyrene	
55B	naphthalene	ND		2,3,7,8-tetrachlorodibenzo-	
56B	-	ND		p-dioxin	NO

ND = None detected above the average reporting limit of 25,000 ppb.

Reported by: Checked by:

NA = Not applicable.

*Trace concentrations detected below the average reporting limit.

(a) coelute

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GEOTECHNICAL ENGINEERS INC.

1017 MAIN STREET - WINCHESTER - MASSACHUSETTS 01890 (617) 729-1625

PRINCIPALS

RONALD C.HIRSCHFELD

STEVE J. POULOS

DANIEL P LA GATTA

RICHARD F MURDOCK

GONZALO CASTRO

August 30, 1984 Project 84291

Mr. Steve Barlow
J.F. White Contracting Co.
One Gateway Center
Newton, MA 02158

Dear Steve:

Please find attached the results of the chemical analysis of 9 granular fill samples obtained at the South Station Intermodal Transportation. Laboratory results indicate that granular fill samples from the trackyard are free of USEPA priority pollutant volatile organic compounds, PCB's and pesticides. A trace of phenol (an acid organic extractable compound) was detected in one soil sample. Metal concentrations in leachate from the granular fill did not exceed the maximum contaminant levels specified by EPA.

Base/Neutral Extractable Compounds, most of which belong to a class of hydrocarbons refered to as Polynuclear Aromatic Hydrocarbons (PAH's) were detected in all granular fill samples collected by GEI. Concentrations of Base/Neutral Compounds, including PAH's ranged between 1.03 to 229.47 µg/g. (parts per million, (ppm). Only 3 samples contained greater than 100 ppm PAH's.

Pursuant to our discussion on August 23, regarding the renovation of VOC contaminated soil, the following amendment will be made to the Environmental Monitoring Program:

Page 6, Paragraph II, Item 5: shall read

Soil samples exhibiting VOC headspace concentrations between 10 and 100 ppm will be renovated on site and removed to a DEQE approved disposal site or used in on-site enbankments at the discretion of the contractor. Renovation of contaminated soils will entail spreading and aeration, until representative soil samples exhibit less than 10 ppm headspace concentration of VCC's.

Renovation will be conducted in areas isolated from people and adjacent dwellings.

Very truly yours,

GEOTECHNICAL ENGINEERS INC.

Margret M. Hanley Geologist

Richard F. Murdock, P.E. Principal

MMH/RFM/alm attachments



Cambridge Analytical Associates

1106 Commonwealth Avenue / Boston, Massachusetts 02215 / (617) 232-2207

FORMAL REPORT OF ANALYSIS

PREPARED FOR:

Geotechnical Engineers 1017 Main Street Winchester, MA 01890 Attn: Margaret Hanley

CUSTOMER ORDER NUMBER:

84291

CAMBRIDGE ANALYTICAL ASSOCIATES, INC.

REPORT NUMBER:

84-899

DATE PREPARED:

August 9, 1984

PREPARED BY:

Keith A. Hausknecht David L. Fiest



Cambridge Analytical Associates

TABLE OF CONTENTS

- 1. INTRODUCTION
- 2. ANALYTICAL METHODS
- 3. RESULTS
- 4. QUALITY ASSURANCE DOCUMENTATION

 Certification

1. INTRODUCTION

This report summarizes results of chemical analyses performed on samples received by CAA on July 31, 1984. Analytical methods employed for these analyses are described in Section 2 and results are presented in Section 3. The last section contains certifications supporting the analytical results.

2. ANALYTICAL METHODS

Analytical methods utilized for sample analysis are summarized in Table 1. For analysis of EP toxicity, the sample was extracted according to methods specified by EPA (1982a). The leachate was then analyzed for metals according to methods of EPA (1979, 1982a).

3. RESULTS

Results of EP toxicity analyses are presented in Table 2. Concentrations of eight metals do not exceed the MCLs specified by EPA (1982a) and the sample is considered to be non-hazardous on the basis of EP toxicity.

Table 1. Summary of Analytical Methods

Constituent	Method Reference	Method Description
Metals Sample Preparation (EP toxicity)	Method 1310 (1)	EP test
Sb As Ba Be Cd Cr Cu Po Hg Ni Se Ag T1 Zn V	Method 204.2 (1) Method 206.2 (1) Method 200.7 (1) Method 200.7 (1) Method 213.1 (1) Method 200.7 (1) Method 200.7 (1) Method 239.1 (1) Method 245.1 (1) Method 200.7 (1) Method 270.2 (1) Method 270.2 (1) Method 279.2 (1) Method 279.2 (1) Method 200.7 (1) Method 200.7 (1) Method 200.7 (1) Method 200.7 (1)	GFAAS GFAAS ICP ICP FAAS ICP ICP FAAS COld-vapor AAS ICP GFAAS ICP GFAAS ICP
Volatile Organic Compounds	Method 624 (2)	Purge and trap, gas chromatography/ mass spectrometry
-Semivolatile Organics- Acid Extractables	Method 8240 (1)	Solvent extraction; capillary gas chromatography/mass spectrometry
Semivolatile Organics- Base/Neutral Extractables	Method 8240 (1)	Solvent extraction; capillary gas chromatography/mass spectrometry
Pesticides (PCBs)	Method 608 (3)	Solvent extraction; gas chromatography

⁽¹⁾U.S. EPA. 1982a. <u>Test Methods for Evaluating Solid Waste-Physical/Chemical Methods</u>. SW-846. Office of Solid Waste, and Emergency Response, U.S. EPA, Washington, D.C.

GFAAS - Graphite furnace absorption spectrophotometry FAAS - Flage atomic absorption spectrophotometry ICP - Inductively coupled argon plasma emission seasons assessed.

⁽²⁾U.S. EPA. 1979. Methods for Chemical Analysis of Water and Wastes. EPA 600/4-79-323 (Revised, March 1983). EPA/EMSL, Cincinnati, Offic.

⁽³⁾U.S. EPA. 1982b. Methods for Organic Chemical Analysis of Municipal and Industrial Mastewater. EPA 000/4-82-057. EPA/EMSL, Cincinnati, Orio.

Table 2. Results of EP Toxicity Analyses

Constituent	MCL ^a	Client CAA ID:		M2 8405150	M3 8405151	M4 8405152	A5 8405453
Sb (mg/1)			0.006; 0.007 ^a	<0.005	<0.005	<0.005	<0.005
As (mg/1)	5.0	·	<0.05; <0.05 ^a	<0.05	<0.05	<0.05	<0.05
Ba (mg/l)	100		0.07; 0.09 ^a	0.04	0.05	0.10	0.06
Be (mg/1)			<0.01; <0.01 ^a	<0.01	<0.01	<0.01	<0.01
Cd (mg/1)	1.0	•	<0.05; <0.05 ^a	<0.05	<0.05	<0.05	<0.05
Cr (mg/1)	5.0		<0.05; 0.05 ^a	<0.05	<0.05	<0.05	<0.05
Cu (mg/1)			<0.01; <0.01 ^a	<0.01	<0.01	<0.01	<0.01
Pb (mg/1)	5.0		<0.5; <0.5 ^a	<0.5	<0.5	<0.5	<0.5
flg (mg/1)	0.2		<0.0005; <0.0005 ^a	<0.0005	<0.0005	<0.0005	<0.9905
Ni (mg/l)	· ,		<0.05; <0.05 ^a	<0.05	<0.05	<0.05	<0.05
Se (my/1)	1.0		<0.005; <0.005 ^a	<0.005	<0.005	<0.005	<0.005
Ag (mg/1)	5.0	•	<0.05; <0.05 ^a	<0.05	<0.05	<0.05	<0.05
11 (mg/l)	 , .		<0.005; <0.005 ^a	<0.005	<0.005	<0.005	<0.005
Zn (mg/l)).11; 0.18 ^a	0.07	0.16	0.40	0.19
V (mg/1)	 .	<u>.</u>	<0.01; <0.01 ^a	<0.01	<0.01	<0.01	<0.01

^аСРЛ (1982а)

buplicate analyses performed.

Table 2 (cont'd). Results of EP Toxicity Analyses

Constituent	MCL ^a	Client 1D: CAA 1D:	M6 8405154	м <i>1</i> 8405155	M8 8405156	H9 84051 5 7
Sb (mg/1)			U . U2	0.006	<0.005	<0.005
As (my/l)	5.0		<0.05	<0.05	<0.05	<0.05
Sa (mg/l)	100		0.22	0.13	0.09	0.12
ყლ (mg/l)			<0.01	<0.01	<0.01	<0.01
Gd (mg/l)	1.0	•	<0.05	<0.05	<0.05	<0.05
Cr (my/1)	5.0		<0.05	<0.05	<0.05	<0.05
Ou (mg/1)	, man pan:	·	<0.01	<0.01	<0.01	<0.01
₽b (mg/T)	5.0		<0.5	<0.5	<0.5	<0.5
Hg (mg/1)	0.2	•	<0.0005	<0.0005	<0.0005	<0.0005
Ni (mg/l)			<0.05	<0.05	<0.05	<0.05
Se (mg/1).	1.0		<0.005	<0.005	<0.005	<0.005
Ag (mg/1)	5.0		<0.05	· <0.05	<0.05	<0.05
T1 (mg/1)			<0.005	<0.005	<0.005	<0.005
Zn (mg/1)			1.0	0.31	0.17	0.17
V (mg/1)			<0.01	<0.01	<0.01	<0.01

^{1&}lt;sub>EPA</sub> (1982a)

CAMBRIDGE ANALYTICAL ASSOCIATES. INC.

Table 3. Concentrations of Volutile Organic Combounds (Method $624^{\frac{1}{4}}$)

Client: Geotechnical Engineers

Project No.: d4-dyy

Date Samples Received:

July 31, 1984

Reported by: EL

Date: Analysis Completed: August 7, 1984

Checked by: 4:5

	,	Concentration of five west we sent topins?										
Compos	and	Sample 10: CAA 10:	Composite 1A.4.C 8405140	Composite 2A.3.0 8405141	Combisted 3A.a.C 8405142	Compos: Ce 47, 3 8405143	Campasice 54.8.C 8405.64	531204m03 6, Ao 6416048				
(2v)	acrolein											
(37)	acrylonitri	le										
(4v)	benzene			· · · · · · · · · · · · · · · · · · ·								
(6v)	Carbon tetr											
(7v)	Chlurobenze		·									
-	1.2-dichlor	·		·			. •					
	1,1,1,-tric											
	1,1-dichion											
	1,1,2-tricn											
		rachloroetha	ો લ									
(16v)	chloroecnan	e .										
(19v)	2-chloroeth	ylvinyl ether	•									
(23v)	chlorotum	,										
(29 v)	1,1-dichlor	oetnylene										
(30V)	trans-1,2-d	iculoroethyle	ne			··········						
(32v)	1,2-gionlar	ohlohque			· · · · · · · · · · · · · · · · · · ·							
(33v)	trans-1,3-d	ichloroproper	ie ·	<u></u>		 						
	c15-1,3-dic	hloropropene										
(3av)	ethyroenzen	e		·								
(44v)	methylene c	nlocia						·				
	chlorometha				* .							
	promomecnan							<u></u>				
	bromorons	e										
	<u>.</u>						 					
	bromudicalo		.	· ·	<u> </u>							
	fluorenten											
		luoromechane			•							
(>1+)	culoconioco	mane Chane										
(454)	tetracniuro	etnylene						·				
(30V;	täluene						·					
(5/2)	antenturbet	Путепе	_		·····	-						
(42 *)	zinyi dalar	:de		·				·				
	Jetestian L	tm t f	lüü	4			4					

destination. chi autitati the transfer of the total and frances of

CAMBRIDGE AMALYTICAL ASSOCIATES, INC.

Table 3 (cont'd). Concentrations of Volatile organic Compounds (Method 524)

Client: Geotechnical Engineers

Project No.: 44-899

Date Samples Received:

July 31, 1934

Reported by: TL

Date Analysis Completed: August 7, 1984

Checked by: Eff.

·	Sample ID:		ott. 13. Ch. art. art	
Compound	CAA ID:	7A.s.C 84U5146	Composite #A.3.C #Aus147	Cum.us:te 9A,C 84U5148
			V 24 W 4	
(2v) acrolein				•
(3v) acrylunitrile				
(4v) benzene	·	· · · · · · · · · · · · · · · · · · ·		
(6v) carbon tetrach	loriqu	-		
(7v) chlurobenzene				
(10v) 1,2-dichloroet	nane			
(11v) i.i.ltrichlo	roetnane			
(13v) 1,1-dichloroec	nane			
(14v) 1,1,2-trichlor	oethane			
(15v) 1,1,2,2-tetrac	nluroethane			
(16v) chloroethane.				
(19v) 2-chloroethylv	inyl ether '			<u> </u>
(23v) chlurofurm	•			
(29v) I,1-dichloraet	nylene	·	•	
(3Uv) trans-1,2-dicn	laroetnylene	 		
(32v) 1,2-dichlorour	opane			· · · · · · · · · · · · · · · · · · ·
(33v) trans-1,3-dich	loropropene			
cis-:,3-dicniu	ropropene			<u> </u>
(384) ethylbenzene	······································		······································	
(44v) methylene chlo	ride			
(45v) chloromechane	•		<u>-</u> -	
(46v) Dromomethane			 	
(47v) bronsform				
(48v) bromodichlorom	ethane			· · · · · · · · · · · · · · · · · · ·
(49v) fluorotrichlor				
(50v) dichlorodiiluo				
(51v) chlurudibromom				
(35v) tetrachlorauth				
(dov) tuluene	, rane			·
(3/) trichlargethy:				· · · · · · · · · · · · · · · · · · ·
(day) vinyi enturias				
Jetaution (ta)	t	1	3	: 3

²Cuncentrations less than the deception limit are formal ink. Concertrations of and Luightees the detection limit, we haden as their excess off a deception limit, we haden as their excess off a deception in the concentration in the concentration.

Table 4. Concentration of Acid/Base/Reutruf Extractables (Method 625)

Client: Geotechnical Engineers

Report No.: 64-699

Date Samples Received:

July 31, 1984

Hapartea by: No

Date Analysis Completed: August 1, 1984

Chicken up: 455

CAX ID: 8405158 8405157 8405160 8405161 94 ACIU COMPOUNDS (21A) 2,4,6-trichlorophenol (22A) p-chloro-in-cresol (24A) 2-chlorophenol (31A) 2,4-dimethylphenol (34A) 2,4-dimethylphenol (34A) 4-nitrophenol (34A) 4-nitrophenol (34A) 2,4-dinitrophenol (34A) pentachlorophenol (34A) pentachlorophenol (35A) phenol 4 methylphenol Detection Limit 0.13 0.12 0.08 0.07 0.00 8ASE/NEURAL COMPOUNDS (18) acenaphthene (4.5 1.1 5.4 (50) benzidine (80) 1,2,4-trichlorobenzene (99) hexachloroethane (120) nexachloroethane (121) nexachloroethane (123) 1,2-dichloroenzene (258) 1,2-dichloroenzene (258) 1,2-dichloroenzene (260) 1,4-dichlorobenzene	6:1-5 Uo 162
(21A) 2,4,5-crichlorophenoi (22A) p-chloro-m-crèsol (24A) 2-chlorophenoi (31A) 2,4-dichlorophenoi (34A) 2,4-dichlorophenoi (54A) 2-nitrophenoi (54A) 4-nitrophenoi (54A) 4-nitrophenoi (54A) pentachlorophenoi (54A) pentachlorophenoi (54A) pentachlorophenoi (54A) pentachlorophenoi (54A) pentachlorophenoi (54A) pentachlorophenoi (54B) 1,2,4-trichlorophenoi (54B) 1,2,4-trichlorophenoi (54B) 1,2,4-trichlorophenoi (54B) 1,2,4-trichlorophenoi (54B) 1,2-iichlorophenoi (54B) 1,2-iichlorophenoi (54B) 1,2-iichlorophenoi (54B) 1,2-iichlorophenoi (54B) 1,3-iichlorophenoi (54B) 1,4-iichlorophenoi (54B) 1,4-iich	
(21A) 2,4,6-tricnluropnenoi (22A) p-cnloro-m-cresol (24A) 2-cnloropnenoi (31A) 2,4-dintropnenoi (34A) 2,4-dimethylpnenoi (54A) 2-nitropnenoi (54A) 4-nitropnenoi (54A) 4-nitropnenoi (54A) 4-nitropnenoi (54A) 4-dinitro-2-methylphenoi (54A) pentachloropnenoi (54A) pentachloropnenoi (54A) pentachloropnenoi (54A) phenoi 4 methy pnenoi Detection Limit 0.13 0.12 0.09 0.40 0.4	
(24A) 2-cnloro-m-cresol (24A) 2-cnlorophenol (31A) 2,4-dimethylphenol (34A) 2,4-dimethylphenol (34A) 2-nitrophenol (34A) 4-nitrophenol (34A) 4-nitrophenol (34A) 4-dimitro-2-methylphenol (34A) pentachlorophenol (34B) pentachlorophenol (34B) Detection Limit 0.13 0.12 0.08 0.07 (34B) pentachlorophenol (34B) 1,2,4-trichlorophenol (34B) 1,2,4-trichlorophenol (34B) 1,2,4-trichlorophenol (34B) 1,2-dichlorophenol (34B) 1,2-dichlorophenol (34B) 1,2-dichlorophenol (34B) 1,2-dichlorophenol (34B) 1,2-dichlorophenol (34B) 1,3-dichlorophenol (34B) 1,4-dichlorophenol (34B) 1,4-dichloro	
(24A) 2-cnloropnenot (31A) 2,4-dicnloropnenot (34A) 2,4-dimethylphenot (5/A) 2-mitropnenot (5/A) 2-mitropnenot (5/A) 2,4-dimitropnenot (5/A) 2,4-dimitropnenot (5/A) 2,4-dimitro-2-methylphenot (5/A) pentachlorophenot (6/A) pentachlorophenot (6/A) phenot 4 methylphenot Detection Limit 0.13 0.12 0.03 0.07 0 BASE/NEUTRAL COMPOUNDS (18) acenaynthene (50) benzidine (80) 1,2,4-trichloropenzene (98) hexachloropenzene (120) nexachloropenzene (121) nexachloropenzene (122) nexachloropenzene (123) bis (2-chloropenzene (250) 1,2-iichloropenzene (260) 1,3-iichloropenzene (271) 1,4-dichloropenzene	
(31A) 2,4-dimethylphenol (34A) 2,4-dimethylphenol (57A) 2-nitrophenol (58A) 4-nitrophenol (59A) 4-nitrophenol (59A) 4-finitro-2-methylphenol (59A) pentachlorophenol (59BASE/NEUTRAL COMPOUNDS (18) acenaphthene 4.5 1.1 5.4 (50) benzidine (50) benzidine (50) benzidine (18) 1,2,4-trichlorophenzene (19) hexachlorophenzene (19) hexachlorophenzene (19) hexachlorophenzene (19) 1,2-dichlorophenzene (20) 1,3-dichlorophenzene (20) 1,4-dichlorophenzene	
(34A) 2,4-dimethylphenol (57A) 2-nitrophenol (58A) 4-nitrophenol (59A) 4-nitrophenol (59A) 4,6-dinitro-2-methylphenol (59A) pentachlorophenol (65A) pentachlorophenol (65A) phenol 4 methylphenol Detection Limit 0.13 0.12 0.09 0.07 (8ASE/NEUTRAL COMPOUNDS (18) acenaphthene (4.5 1.1 6.4 ((50) benzidine (88) 1,2,4-trichloropenzene (98) hexachloropenzene (128) hexachloropenzene (128) hexachloropenzene (128) 2-chloropenzene (128) 2-chloropenzene (258) 1,2-dichloropenzene (268) 1,3-dichloropenzene (278) 1,4-dichloropenzene	<u> </u>
(5/A) 2-nitrophenol (5/A) 4-nitrophenol (5/A) 2,4-dinitrophenol (5/A) 4,5-dinitro-2-methylphenol (5/A) pentachlorophenol (5/A)	
(38A) 4-nitrophenol (39A) 2,4-dinitrophenol (60A) 4,6-dinitro-2-methylphenol (34A) pentachlorophenol (65A) phenol 4 methylphenol Detection Limit 0.13 0.12 0.03 0.07 0 BASE/NEUTRAL COMPOUNDS (18) acendynthene (4.5 1.1 5.4 (50) benzidine (80) 1,2,4-trichlorobenzene (18) hexachloroetnane (183) bis (2-chloroetnyl) ether (208) 2-chloromaynthalene (258) 1,2-dichloromenzene (260) 1,3-dichloromenzene (279) 1,4-dichloromenzene	
(SUA) 2,4-dinitrophenol (SUA) 4,6-dinitro-2-methylphenol (SEA) penol 4 methylphenol Detection Limit 0.13 0.12 0.09 0.40 BASE/NEUTRAL COMPOUNDS (18) acenaynthene 4.5 1.1 5.4 (SU) 1,2,4-trichlorobenzene (98) hexachlorobenzene (128) hexachlorobenzene (128) hexachlorobenzene (208) 2-chlorostyl) ether (208) 2-chlorostyl) ether (208) 1,2-vichlorobenzene (258) 1,3-vichlorobenzene (268) 1,3-vichlorobenzene	
(buA) 4.6-dinitro-2-methylphenol (d4A) pentachlorophenol (d5A) phenol 4 methylphenol 0.40 Detection Limit 0.13 0.12 0.09 0.07 (d8ASE/NEUTRAL COMPOUNDS (18) acenaphthene 4.5 1.1 6.4 (bo) benzidine (88) 1.2.4-trichloropenzene (98) hexachloroethane (128) nexachloroethane (128) tis (2-chloroethyl) ether (208) 2-chloromaphthalene (258) 1.2-dichloropenzene (268) 1.3-dichloropenzene (278) 1.4-dichloropenzene	· · ·
(34A) pentachlorophenol (65A) phenol 4 methy phenol Detection Limit 0.13 0.12 0.09 0.07 (88) 4.5 1.1 6.4 (bc) benzione (88) 1,2,4-trichloropenzene (128) hexachloropenzene (128) hexachloropenzene (208) 2-chloropenzene (208) 2-chloropenzene (208) 1,2-dichloropenzene (208) 1,3-dichloropenzene (278) 1,4-dichloropenzene	
(65A) phenol 4 methy phenol Detection Limit 0.13 0.12 0.08 0.40 BASE/NEUTRAL COMPOUNDS (18) acenaynthene 4.5 1.1 6.4 (50) benzidine (80) 1,2,4-trichlorobenzene (98) hexachlorobenzene (120) nexachloroethane (133) bis (2-chloroethyl) ether (208) 2-chloromaphthalene (258) 1,2-dichlorobenzene (260) 1,3-dichlorobenzene (279) 1,4-dichlorobenzene	
4 metny prienul 0.40 Detection timit 0.13 0.12 0.08 0.07 (BASE/NEUTRAL COMPOUNDS (18) acenaunthene 4.5 1.1 6.4 (5a) benziaine (8B) 1,2,4-trichlorobenzene (9B) hexachiorobenzene (12B) nexachioroethane (12B) sis (2-chloroethyl) ether (20B) 2-chloromaunthalene (25B) 1,2-dichlorobenzene (26B) 1,3-dichlorobenzene	
Detection timit 0.13 0.12 0.09 0.07 (BASE/NEUTRAL COMPOUNDS (18) acenaunthene 4.5 1.1 6.4 (50) benzidine (80) 1,2,4-trichlorobenzene (120) hexachlorobenzene (120) hexachlorobenzene (120) z-chlorobenzene (250) 1,2-dichlorobenzene (260) 1,3-dichlorobenzene (270) 1,4-dichlorobenzene	
BASE/NEUTRAL COMPOUNDS (18) acenaphthene 4.5 1.1 5.4 (50) benzidine (88) 1,2,4-trichlorobenzene (98) hexachlorobenzene (128) hexachloroethane (133) bis (2-chloroethyl) ether (208) 2-chloromaphthalene (258) 1,2-dichlorobenzene (260) 1,3-dichlorobenzene	
BASE/NEUTRAL COMPOUNDS (18) acenaphthene 4.5 1.1 6.4 (56) benzidine (88) 1,2,4-trichlorobenzene (98) hexachlorobenzene (128) hexachlorobenzene (128) bis (2-chlorobenzene (208) 2-chloromaphthalene (258) 1,2-dichlorobenzene (268) 1,3-dichlorobenzene (278) 1,4-dichlorobenzene	.u8
(88) 1,2,4-trichlorobenzene (98) hexachlorobenzene (128) hexachloroethane (133) bis (2-chlüroethyl) ether (208) 2-chlüromaphthalene (208) 1,2-dichlüromenzene (268) 1,3-dichlüromenzene (279) 1,4-dichlüromenzene	
(98) hexachiorobenzene (128) hexachioroethane (133) bis (2-chioroethyl) ether (208) 2-chioronaphthalene (208) 1,2-dichioropenzene (268) 1,3-dichioropenzene (278) 1,4-dichioropenzene	
(128) hexachloroethane (188) bis (2-chloroethyl) ether (208) 2-chloromaphthalene (258) 1,2-dichloropenzene (258) 1,3-dichloropenzene (278) 1,4-dichloropenzene	
(183) bis (2-chloroetnyl) ether (208) 2-chloronaphthalene (208) 1,2-dichloropenzene (268) 1,3-dichloropenzene (278) 1,4-dichloropenzene	
(208) 2-chioronaphthalene (258) 1,2-dichioropenzene (268) 1,3-dichioropenzene (278) 1,4-dichioropenzene	
(258) 1,2-dichtoropenzene (268) 1,3-dichtoropenzene (278) 1,4-dichtoropenzene	
(26%) 1,3-iichluropenzene (27%) 1,4-uichluropenzene	
(278) 1,4-u)cnturopenzene	
2441 9 91 44 4	
(250) 3,3'-dichlurapenziume	
(333) 2,4-3111 Crocditions	
(350) 2,3-dinitrotoluene	
(3/3) 1,2-dipmenyinyanizine	
	.:!
(458) 4-chtarophenyt phenyt ether (415) 4-chtarophenyt phenyt ether	



Table 4 (cont'd). Concentration of Acid/Base/Neutral Extractables (Method 6251)

Client: Geotecnnical Engineers

Report No.: 84-899

Date Samples Received: July 31, 1984

Reported by: NS

Date Analysis Completed: August 1, 1984

Cnecked by: Life

		Concentr:	15 (1166) ²			
	Sample ID: CAA ID:	ABN-6 8405163	ABN-7 8405164	AUS los	8405166	
		7				
BASE NEUTRAL COMPOUNDS (CO	ont'd)					
(42B) bis (2-chloroisopro	pyl) ether					•
(438) bis (2-chloroecnoxy) methane	•	•			
(52B) hexachloroputadiene	•					
(53B) néxachlórócyclopent	adiene					
(548) isopnorone						
(558) naphthalene		9.7	1.5			
(568) nitropenzene			•			
(62B) N-nitrosodiphenylam	ine			 	·	
(638) N-nitrosodipropylas	ine					
(col) bis (2-ethylnexyl)	phthalate	8.6	· · · · · · · · · · · · · · · · · · ·	-		· · · · · · · · · · · · · · · · · · ·
(u7B) Denzyl Dutyl phtmal	ale	•			·	
(odu) di-m-outyl phthalat	e -	· · · · · · · · · · · · · · · · · · ·				
(bud) di-n-octyl phthalat	ë					
(70B) diethyl phthalate	•		-			
(71B) dimetnyl phthalate						·
(728) Denzo(a)anthracene		4.3	13.			
(738) benzo(a)pyrene	•	5.0	14.			
(748) benzo(b)fluoroanthe	ne	5.0	5.5			
(75B) Denzo(k)fluoroantne	ne	5.0	7.9			
(768) chrysene	<u> </u>	4.0	8.7			•
(778) acenaphtnylene			0.68			
(78B) anthracene	······································		7.0	U.12	0.21	
(798) Denzo(ghi)perylene			5.3			
(808) fluorene		5.9	3.1		· · · · · · · · · · · · · · · · · · ·	
(dlu) phenanthrene		20.	25.	∪. ÷u	U.54	
(d2d) diDenzo(a,n)anthrac	 Lene.		3.5			
(833) indeno(1,2,3-cd)pyr	'ene		5.3		-	
(d4ii) pyrene		lu.	26.	u.32	J.27	
Detection Limit		0.43	U.u.e	J.38	9.11	_

U.S. EPA, 1982. Methods for drugnic Chemical Analysis of Municipal and Industrial Mastewater. EPA 600/4-02-057. EPA/EMSE, Cincinnati, Unio.

Concentrations less than the detection limit are left blank. Concentrations between 1 and 10 times the limit of detection are listed as chara levels (TR).

CAMURIDGE ANALYTICAL ASSUCIATES. INC.

Table 5 (cont.d). Concentration of Pesticides and PCBs (Method odd^1)

Client: Gentechnical Engineers

Report No.: 84-899

Date Samples Received:

July 31, 1984

Reported by: SAD

Date Analysis Completed: August 1, 1984

Checked by:

		Concentr	ition - wy/ j di	F	2
Cumpound	Sample ID: CAA IU:	ABN-6 8405163	ABN-7 8405104	AGN-3 8405105	A8N-3 8405166
		,			
PESTICIDES AND PCBS					
(89P) aldrin		*			
(YUP) dieldrin			•		
(91P) chlordane	•				
(92P) 4.4°-DOT	· · · · · · · · · · · · · · · · · · ·	-			
(93P) 4,4'-DDE					
(94P) 4,4'-000					
(95P) endosülfan-alp	na			•	
(96P) endosúlfan-bet	a				
(97P) endosulfan sul	face		To the second		
(98P) endrin					
(99P) endrin aldehyd	e				<u> </u>
(100P) heptachlor				·	
(1U1P) heptachlor epo:	xide	** -			
(1U2P) BHC-alpha			-:		
(103P) BHC-beca	, , , , , , , , , , , , , , , , , , ,				
(luar) BHC-delta					
(105P) BHC-gamma (line	dane)				
106P) PCB - 1242					
107P) PCB - 1254					-
(10aP) PCB - 1221					
(1UJP) PCB - 1232			- , ; 		· · · · · · · · · · · · · · · · · · ·
(110P) PCB - 1248					
111P) PCB - i26u					
	·		1 2 2 2 2		
112P) PC3 - 1016					
113P) toxaphene	 -		<u> </u>		
Detection Limit		0.01	0.01	15.0	0.01

U.S. EPA, 1962. Methods for Organic Chemical Analysis of Municipal and Industrial Massemater. EPA 60074-62-057. EPA/EMSE, Cincinnati, Unio.

Concentrations less than the detection limit are left plank. Concentrations between 1 and 10 times detection that are listed as trace (evers (Td).

4. QUALITY ASSURANCE DOCUMENTATION

Certification

This work has been checked for accuracy by the following staff personnel:

Director, Inorganic Cnemistry Laboratory Kith 9. Hanskucht

Keith A. Hausknecht

Director, Organic Chemistry Laboratory

David L. Fiest

ERCO Energy Resources Co. Inc.

203 Alewife Brook Parkway Camoridge, Massichusetts 02108 (617) 661-3111

July 20, 1984

Ms. Margaret Hanley Geotechnical Engineers, Inc. 1017 Main Street Winchester, MA 01890

Dear Margaret:

Enclosed are the final results for the analyses performed on the six sediment samples for project #84291 received on July 9, 1984. I hope the lateness of this report has not caused you any inconvenience.

If there any questions concerning these data, I would be happy to answer them for you. I can be contacted at 661-3111.

Sincerely,

Robert Watkins

Inorganic Laboratory
Manager

•	•				
		* *			
CLIENT	Geotechnical Enginee	rs.Inc.	ERCO / ENERGY	RESOURCES (io. Inc
CLIENT ID	8-3				
ERCO ID	5413	CR	GANIC PRICRITY	POLLUTANT' A	MALYSIS
SAMPLE RECEIVED	7/9/84				
NALYSIS COMPLETED	7/16/84		ACID	COMPOUNDS	
RESULTS IN	ng/g (ppb)				
		•		•	:
	21A 2,4,6-trichlorop	heno l	ND		
	22A p-chloro-m-creso		ND		
	24A 2-chlorophenol		NO	•	
	31A 2,4-dichlorophen	01	ND		
	34A 2,4-dimethylphen	ol.	ND		
	57A 2-nitrophenol		ND	•	
	58A 4-nitrophenol	•	ND	* .	
¥	59A 2,4-dinitropheno		ND		
	60A 4,6-dinitro-o-cr		NO	1.	
:	64A pentachloropheno	1	ND	,	
•	65A phenol		ND		
NO			•		
ND = None dete	cted above the average	reporting	Reported by		
limit of	esou ppo.		Checked by	y: <u>ica</u>	

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CL IENT	Geo	technical	Engineers.In	<u>c.</u>	ER CO	/ E	ÄERGŸ	RESOURC	RCES CO. INC.			
CLIENT ID	TP-	1		_								
ERCO ID	541	4		_ (DRGANIC	PRI	ORITY	POLLUTA	ia Tr	T ANALYSIS		
SAMPLE RECEIVED	7/9	/84		<u> </u>		•						
ANALYSIS COMPLETED	7/1	6/84					ACID	COMPOUN	DS			
RESULTS IN	ng/	(dadd) b		_ _	•							
									. /Er <u>=</u> .			
	21A	2,4,6-tr	richlorophenol			ND	•"					
•	22A	p-chloro	o-m-cresol			ND	,			*.		
	24A	2-chlore	opheno l			ND		• .				
	31A	2,4-dici	hlorophenol			ND		•				
	34A	2,4-dime	ethylphenol		• .	ND						
	57A	2-nitro	phenol			ND				4		
	58A	4-nitro	pheno 1			ND						
,	59A	2,4-din	itrophenol		•	מא				•		
	60A	4,6-din	itro-o-cresol			ND				· .		
	64A	pent ach	lorophenol	•		ND '			•			
	65A	pheno1	· .	•	•	NO				•		
ND = None deta	ected	above th	e average rep	orting]	Repo	rted l	y:	.G			
limit of	440	opb.				Chec	ked by	y:x	<u></u>			

The second production of the contract of the c

CLIENT CLIENT ID	Geotechnical Engineers, Inc. TP-2 (Dublicate)	ERCO / ENERGY	RESOURCES CO. INC.
ERCO ID SAMPLE RECEIVED	5435D 7/9/84	CREANIC PRIORITY	POLLUTANT ANALYSIS
ANALYSIS COMPLETED RESULTS IN	7/16/84 ng/g (ppb)	ACID	COMPOUNDS
			,
	21A 2,4,6-trichlorophenol	ND	
	22A p-chloro-m-cresol	ND	
	24A 2-chlorophenol	NO	•
	31A 2,4-dichlorophenol	ND	
,	34A 2,4-dimethylphenol	ND	
	57A 2-nitrophenol	מא	
	58A 4-nitrophenol	NO	•
	59A 2,4-dinitrophenol	ON	
•	60A 4,6-dinitro-o-cresol	ND	
	64A pentachlorophenol	ND	
	65A phenol -	NO	
ND = None deter	cted above the average reporting 4800 ppb.	ng Reported by Checked by:	

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	CLIENT Geotechnical	Engineers,	Inc. ERCO / ENERGY RESOURCES CO. INC
	CLIENT ID B-2		
	ERCO ID 5412		VOLATILE COMPOUNDS
	AMPLE RECEIVED 7/9/84		
ANAL	YSIS COMPLETED 7/13/84	· ·	EPA 601 AND 602 METHODS
	RESULTS IN <u>ng/g (pob)</u>		
	601 COMPOUNDS	÷	602 COMPOUNDS
45V	Chloromethane	ND	Benzene ND
46V	Bromomethane	NĎ	Toluene ND
V88	Vinyl chloride	ÑD	Ethyl Benzene ND
167	Chloroethane	ND	P-Xylene ND
447	Methylene chloride	ND	M-Xylene ND
297	l,l-dichloroethylene	ND	O-Xylene ND
137	1,1-dichloroethane	ЙÒ	Styrene ND
307	1,2-trans-dichloroethylene	ND	N-Propylbenzene ND
237	Chloroform	ND	O-Chlorotoluene ND
107	1,2-dichloroethane	אס	Trimethyl Benzene ND
117	1,1,1-trichloroethane	סא	P-Dichlorobenzene ND
67	Carbon tetrachloride	ND	M-Dichloropenzene ND
487	Bromodichloromethane	ND	N-Butylbenzene ND
32 V	1,2-dichloropropane	מא	O-Dichlorobenzene ND
33 V	Trans-1,3-dichloropropylene	ND	1,2,4-Trichlorobenzene ND
87 V	Trichloroethylene	ND	
51 V	Dibromochloromethane .	ND	
337	Cis-1,3-dichloropropylene	ND	
147	1,1,2-trichloroethane	ND	
477	Bromoform	ND	
150	1,1,2,2-tetrachloroethane	ND	
85V	Tetrachloroethylene	ND	
77	Chlorobenzene	ND	
197	2-chloroethyl vinyl ether	ND	
1141-	ND = Not detected above the of 3 ppb for 601 and 48 *Trace concentrations de reporting limit.	ppb for 60 tected belo	Checked by: VS
	own Peaks 601 0		encwn peaks 502 <u>3</u>
	entration unknowns 601 ND	. Unx	encwn concentration 602
unkn	own concentration based on av	erage respo	unse factor.

TRAILO	Geotechnical	Engineers.	Inc. EXC / EXERG	iy x esourc	ES CO.	INC
CLIENT ID	B-3		* * * * * * * * * * * * * * * * * * * *			
. ERCO ID	5413		YOLATII	אעטפאסט ב	DS .	
SAMPLE RECEIVED	7/9/84				==	
ANALYSIS COMPLETED	7/13/84		EPA 601 /	ND 602 ME	THODS	
RESULTS IN	ng/g (pob)					•
WESSELS IN		:: -				
			· · · · · · · · · · · · · · · · · · ·		 ·	•
601 COMPOUNDS	.*	•	602 COPPOUNDS	•		
45V Chloromethane		NO	Benzene		NO	
46V Bromomethane	•	NO	Toluene:	•	מא	
88V Vinyl chloride		ND.	Ethyl Banzene		HO.	
16V Chloroethane	*	NO.	P-Xylana	*	NO	
44V Methylene chlo	oride	NO.	M-Xy lece	•	NO.	•
29V 1,1-dichloroet	hy lene	NB	Q-Zylene		MD	
13V 1,1-dichloroet	hane	ND .	Styramoto:	•	NO	
30V 1,2-trans-dich	loroethylene	NO	M-Presy idenzace	2	MD	•
23V Chloroform		סא	0-Chlecatolaene	:	MO	
10V 1,2-dichloroes	thane	ND .	Trimethyl Benzen	•	MD	
119 1,1,1-trichlo		ND ON	P-Dieblerobenzen	e	XO.	
6V Carbon tetrac	hloride	ND.	H-Dichlerchenzes	.	K	•
48V Bromodichloro	methane	NB	N-Buty Ibeazene	i g ti ereg	. HD	
324 1,2-dichlorop	ropane	145	0-Dichlorobenzer	18	DM	
	hloropropylene		1,2,4-Trichlord	enzene	NO	ļ.,
87V Trichloroethy	lene	NO.	•			
51V Dibromochloro	methane	MB.				
33V Cis-1,3-dichl	oropropylene	NO	1			
14V 1,1,2-trichlo		ЖĐ				
47V Bromoform		NO.				
15V 1,1,2,2-tetra	chloroethane	MD		. • .		
85V Tetrachloroet		· 190				
7V Chlorobenzene	~	ND			•	
19V 2-chloroethyl			วา - 			
	ving t concr	. a for		•		
	ected above the opp for 601 and			Reported		17.74 _YS
*Trace co	oncentrations d	• •				
•	ng limit.		THE LUNCHTS	-		
Unknown Peaks 601	<u> </u>		மைர் இதுத்த ,602			
Concentration unki	nowns 601 NO	Uni	incen cententration	602		

CLIENT Geotechnical	Englineers	. Inc. ERCO / ENERGY R	ESOURCES CO. IN	IC.
CLIENT ID TP-1	* **			
ERCO ID 5414	· <u></u>	VOLATILE O	COMPOUNDS	
SAMPLE RECEIVED 7/9/84				
ANALYSIS COMPLETED 7/13/84		EPA 601 AND	602 METHODS	•
RESULTS INng/g (pob)	****			
•			· · · · · · · · · · · · · · · · · · ·	
601 COMPOUNDS		602 COMPOUNDS		
45V Chloromethane	ND	Benzene	ND	
46V Bromomethane	מא	Toluene	מא	
88V Vinyl chloride	ND	Ethyl Benzene	NO	
16V Chloroethane	ND	P-Xylene	ND	
44V Methylene chloride	מא	M-Xylene	ND	
29V 1,1-dichloroethylene	ND	0-Xylene	ND	
13V 1,1-dichloroethane	. מא	Styrene	ND	
30V 1,2-trans-dichloroethylene	ND	N-Propylbenzene .	ND	
23V Chloroform	· ND	0-Chlorotoluene	ND	
10V 1,2-dichloroethane	ND	Trimethyl Benzene	ND	
11V 1,1,1-trichloroethane	ND	P-Dichlorobenzene	NO	
6V Carbon tetrachloride	ND	M-Dichlorobenzene	ND	•
48V Bromodichloromethane	מא	N-Butylbenzene	ND	
32V 1,2-dichloropropane	ND ·	0-Dichlorobenzene	ND ND	
33V Trans-1,3-dichloropropylene	ND	1,2,4-Trichlorobenze	- · · -	
87V Trichloroethylene	ND	1,2,4-11 16.11 01 056.12.	ine ND	
51V Dibromochloromethane	ND			
33V Cis-1,3-dichloropropylene	ND	•		
14V 1,1,2-trichloroethane	ND			
47V Bromoform				
	ND			
, , , , , , , , , , , , , , , , , , , ,	ND			
	ND			
7V Chlorobenzene	ŇD		•	
19V 2-chloroethyl vinyl ether	ŊD .	•		
ND = Not detected above the of 1.6 ppb for 601 and *Trace concentrations de	51 ppb for	r 602. Ch	orted by: JrM ecked by: N'S	
reporting limit. Unknown Peaks 601 0	**			
		nknown peaks 602 <u>5</u>		
Concentration unknowns 601 NO	į U i	nknown concentration 602	450	

SAMPLE RECEIVED 7/9/84 NALYSIS COMPLETED 7/14/84 RESULTS IN ng/g (ppb)		VOLATILE COMPOUNDS EPA 601 AND 602 METHODS
601 COMPOUNDS		602 COMPOUNDS
5V Chloromethane	ND	Benzene ND
5V Bromomethane	ND	Toluene ND
8V Yinyl chloride	- ND	Ethyl Benzene ND
6V Chloroethane	ND .	P-Xylene ND
4V Methylene chloride	ND	M-Xylene ND
9V 1,1-dichloroethylene	ND	O-Xylene ND
3V 1,1-dichloroethane	ND	Styrene ND
OV 1,2-trans-dichloroethylene	ND	N-Propylbenzene ND
3V Chloroform	ND	O-Chlorotoluene ND
OV 1,2-dichloroethane	ND	Trimethyl Benzene ND
<pre>IV 1,1,1-trichloroethane</pre>	ND .	P-Dichlorobenzene ND
V Carbon tetrachloride	ND	M-Dichlorobenzene ND
8V Bromodichloromethane	ND	N-Butylbenzene ND
2V 1,2-dichloropropane	ND	O-Dichlorobenzene ND
3V Trans-1,3-dichloropropylene	שא	1,2,4-Trichlorobenzene ND
7V Trichloroethylene	ND	
lV Dibromochloromethane	ND	
3V Cis-1,3-dichloropropylene	ND	
4V 1,1,2-trichloroethane	ND	
7V Bromoform	ND .	•
5V 1,1,2,2-tetrachloroethane	ND	
5V Tetrachloroethylene	סא	•
7V Chlorobenzene	ND	
9V 2-chloroethyl vinyl ether	ND	
ND = Not detected above the of 3 ppb for 601 and 49	average rep	orting limit Reported by: JFM 2. Checked by: VS

			1	Englance	Tae	בזכח / באבז	CV DEFOUR	co	2340
		CLIENT	Geotechnical	engineers,	inc.	ERCO / EHER	GI KESUURC	£5 CU.	INC.
		CLIENT ID	TP-3			VOLATI	וב בחשמחוויי	ne	
		ERCO ID	5416	 		AOLVII	עונים אינים דב	<u>03</u>	
	—	AMPLE RECEIVED	7/9/84			534 601	AND EÖD WE		
	ANAL	YSIS COMPLETED	7/14/84			EPA BUI	AND 602 ME	ו אטטט	
		RESULTS IN	ng/g (pob)						
			·				<u> </u>	·	
		601 COMPOUNDS			602	COMPOUNDS			
	45V	Chloromethane		ND	Ben:	zene		ND	
	46V	Bromomethane		ND	Tol	Reue		ND	
	V88	Vinyl chloride	•	ND	Eth	yl Benzene	• .	ND	
	167	Chloroethane	•	ND	P-X	ylene		ND ·	•
	447	Methylene chlor	ride	מא	M-X	ylene	•	מא	•
	297	1,1-dichloroeti	nylene .	ND	0-X	ylene:		ИD	
	137	1,1-dichloroet	hane	ND -	Sty	геле :	•	ND.	
	307	1,2-trans-dich	loroethy lene	מא	N-P	ropylbenzene	•	ЙD	* :
	237	Chloroform		- ND	0-C	hlorotoluene		ND	•
	107	1,2-dichloroet	hane	ND	Tri	methyl Benzer	1e	ND	٠,
	114	1,1,1-trichlor	oethane	מא	P-0	ich lorobenze	ne i	ND	
	67	Carbon tetrach	loride	מא	M-D	ichlorobenze	ne	ND	•
	487	Bromodichlorom	ethane	NO	N-B	utylbenzene		ND	•
	324	1,2-dichloropr	opane	ЙD	0-0	ichlorobenze:	ne	ND	
	33 V	Trans-1,3-dich	loropropylene	ND	1,2	2,4-Trichloro	benzene	DN	
	877	Trichloroethyl	ene	מא					
	517	Dibromochlorom	ethane .	ND.			1 .		
	33 V.	Cis-1,3-dichlo	ropropylene	ND	•	•			· ·
	147	1,1,2-trichlor	oethane	ND					*
	47 V	Bromoform	•	DM		•			. •
	157	1,1,2,2-tetrac	hloroethane	ND .					
	85V	Tetrachloroeth	y lene	ND			•		•
	77	Chlorobenzene		ND		•		••	
,	197	2-chloroethyl	vinyl ether	סא		·		•	٠.
		ND = Not detection of 2.5 pp	ted above the	average re 50 ppb for	portin 602.	g limit	Reported Checked		VS.
		nown Peaks 601	0			peaks 602			
•	Cond	centration unkno	owns 601 <u>ND</u>	_ Ur	ikacwa	concentration	1 6028	00	

Unknown concentration based on average response factor.

Sample Received:

7/9/84

ERCO / ENERGY RESOURCES CO. INC.

Analysis Completed:

7/16/84

All Results in:

ug/g (ppm) dry wt..

Reported by:

CAK

Checked by:

INORGANIC ANALYSIS

- Data Report -

Client: Geotechnical Engineers, Inc.

ERCO ID	CLIENT 1D	λg	Λв	Ве	Cd	Cr	Cu	Ilg	. Ni
5411	D-1	<0.24	14	<0.24	<0.24	21	79	0.29	7.5
5412	B-2	<0.22	4.2	<0.21	<0.21	13	59	0.007	3.2
5413	B-3	<0.24	14	0.32	<0.23	20	21	0.056	11
5 014	TP-1	0.27	6.4	<0.22	<0.22	10	15	0.30	5.6
541. 5415 541	TP-2	<0.23	14	<0.21	<0.21	15	30	1.2	9.7
5416	TP-3	0.51	20 ີ	<0.28	<0.28	30	150	6.3	13

If customer has any questions regarding analysis, refer to sample in question by its ERCO ID.

Sample Received: 7/9/84

ERCO / ENERGY RESOURCES CO. INC.

Analysis Completed:

7/16/84

All Results in: ug/g (ppm) dry wt.

Reported by:

CAK

Checked by:

LAS

INORGANIC ANALYSIS

- Data Report -

Client: Geotechnical Engineers, Inc.

ERCO	CLI ENT	•		:			· .	·
ID	ID	Pb	Sb ·	Se	Tl	V	Zn	% Solids
5411	B-1	160	<1.2	<1.2	<1.2	20	78	81.9
5412	B-2	20	<1.0	<1.1	<1.1	10	140	89.8
5413	B-3	21	<1.2	<1.2	<1.2	22	66	72.8
5414	TP-1	170	<1.1	<1.1	<1.1	1.1.	48	88.4
5415	TP-2	140	<1.1	<1.2	<1.2	17	72	83.9
5416	TP-3	710	<1.4	<1.5	<1.5	26	420	64.6

If customer has any questions regarding analysis, refer to sample in question by its ERCO ID#.

•	·		•	•
•			•	
CL IENT	Geotechnical Engineers, Inc.	ERCO /	ENERGY RESOURCE	ES CO. INC.
CLIENT ID	TP-1	-		
ERCO ID	5414	ORGANIC P	RIORITY POLLUTA	NT ANALYSIS
SAMPLE RECEIVED	7/9/84			
ANALYSIS COMPLETED	7/16/84		ACID COMPOUN	IOS
RESULTS IN	ng/g (ppb)		•	
	•			
	21A 2,4,6-trichlorophenol	NC	1	
•	22A p-chloro-m-cresol	NC		
	24A 2-chlorophenol	NC		•
	31A 2,4-dichlorophenol	NI	•	
	34A 2.4-dimethylphenol	NI NI	•	• .
•	57A 2-nitrophenol	N		
	58A 4-nitrophenol	NI	· ·	
	59A 2,4-dinitrophenol	N		
•	60A 4,6-dinitro-o-cresol	Ni	ס	
	64A pentachlorophenol	N	0	
	65A phenol	· N		•
	ected above the average report	•	F-:	.6
limit of	440 ppb.	Un	ecked by:	<u> </u>

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CLIENT	Geo	technical Engineers	Inc.	ERCO) / 1	ENERGY	RESOURCES	CO. INC.
CLIENT ID	TP-2			· · · · · · · · · · · · · · · · · · ·				
ERCO ID	541	5		ORGANIC PRIORITY			POLLUTANT ANALYSIS	ANAL YSTS
SAMPLE RECEIVED	7/9	/84						
ANALYSIS COMPLETED	7/1	6/84				ACID	COMPOUNDS	
RESULTS IN	ng/	/g (ppb)					001.1 301103	
	27.6	2 4 6 balablassaba					· · · · · · · · · · · · · · · · · · ·	
	21A	2,4,6-trichlorophe	no i	•	ND			•
	22A	p-chloro-m-cresol			ND			
	24A	2-chlorophenol			ַםא			
	31A				ND		•	
	34A	2,4-dimethylphenol			ND			1
• •	57 A	2-nitrophenol		٠	ND	•		
	58A	4-nitrophenol			ND			
	59A	2,4-dinitrophenol	¥	•	KD			
	60A	4,6-dinitro-o-cres	01	. ;	ND			
	64A	pentachlorophenol	-		ND	•		
	65A	pheno l			ND			4
		above the average r	eportin	ng I	Repo	rted b	y: <u>L</u> G	
limit of	500 p	pb.		.1	Chec	ked by	: <u>K</u> .	

	None detection 1		above the average reportings.	-	eported b	`	
		65A	pheno l		ND .		
•	•	64A	pentachlorophenol	1	O.	•	
		60A	4,6-dinitro-o-cresol		OV		•
•		59 A	2,4-dinitrophenol	!	ar		
		58A	4-nitrophenol	·	OP		
		57A	2-nitrophenol	1	ָם.		
		34A	2,4-dimethylphenol		O.	·	
		31A	2,4-dichlorophenol		. Or		•
•	¥	24A	2-chlorophenol	!	10	•	•
	•	22A	p-chloro-m-cresol		ND		
	7 .3	21A	2,4,6-trichlorophenol	1	10		
					* * * * * * * * * * * * * * * * * * *		* I
RE.	SULTS IN	ng/	(d (bpp)	;			
ANALYSIS C			6/84	į	ACID	ССМРОИНО	<u>s</u>
SAMPLE	RECEIVED		/84				
	ERCO ID 5416		6	ORGANIC	T ANALYSIS		
CLIENT ID		TP-3					•
	CLIENT	Geo	technical Engineers. Inc.	ERCJ	/ EHERGY	RESIGNCE	S CO. IAC.

•	•	,	
CLIENT	Geotechnical Engineers, Inc.	FRCO / ENERGY	RECOURGES OF
CLIENT ID	TP-2 (Duplicate)	LNOO / ENERGY	RESOURCES CO. INC.
ERCO ID	5435D	CRESNIC DOTODITY	001117397 400
SAMPLE RECEIVED	7/9/84	CHEMITE PRIORITY	POLLUTANT ANALYSIS
ANALYSIS COMPLETED	7/16/84	ACTO	CCMBOUNDS
RESULTS IN	ng/g (ppb)	ACID	COMPOUNDS
			:
		4	
		· · · · · · · · · · · · · · · · · · ·	
	21A 2,4,6-trichloropheñol	ND	
•	22A p-chloro-m-cresol	ND	
	24A 2-chlorophenol	ND	
	31A 2,4-dichlorophenol	ND	
•	34A 2,4-dimethylphenol	ND	
	57A 2-nitrophenol	ND	
	58A 4-nitrophenol	ND	
	59A 2,4-dinitrophenol	ND	
	60A 4,6-dinitro-o-cresol	ND	
•	64A pentachlorophenol	ND	
	65A phenol -	NO	
		NO	•
ND = None dete	cted above the average reporti	ng Reported by	': LG
limit of	4800 ppb.	Checked by:	
			Pulsa
			•
	·		•
•			
	•		

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75. Inc. 7 Editachnical Engineers. Inc. लत् । लहात् स्टब्स्ट त. १४८. CLIEFE-ID : TP-3 (Kiniked) CREANIC PRICRITY POLLUTANT ANALYSIS न धन 54363 : SAPLE RECEIVED 7/9/84 ANALYSIS COMPLETED 7/16/84 ACID COMPOUNDS RESULTS IN ng/g (ppb) 21A 2,4,6-trichlorophenol ND p-chloro-m-cresol ----- 4,000 (106% rec.) 22A 2-chlorophenol ----- 3,800 (100% rec.) 24A 31A 2,4-dichlorophenol ND 2,4-dimethylphenol 34A ND 57A 2-mitrophenol ND 58A 4-nitropheno1 ----- 9,000 (240% rec.) 59A 2,4-dinitrophenol ND . 60A 4,6-dinitro-o-cresol · · MD:- 3::4 pentachlorophenol 64A pheno1 ----- 3,500 (82% rec.) 65A ND = None detected above the average reporting Reported by: LG limit of 7,400 ppb. Checked by:

		otachnica)	Engineer	s. Inc.	ERCO / ENE	RGY RESOUR	CES CO. IM	
				1				
ERCO ID 5411					VOLAT	ATILE CUMPOUNDS		
	SAMPLE RECEIVED 7/9/84 ANALYSIS COMPLETED 7/13/84				1			
		/g (pob)	<u> </u>		EPA 601	AND 602 MS	ETHODS	
		/ ч. (роб)	·		:		:	
	601 COMPOUNDS			602	COMPOUNDS	Ç		
45V	Chloromethane		ND			•		
46V	Bromomethane		ND	Benz Tolu			ND	
88 V	Vinyl chloride	•	ND		l Benzene		ND	
167	Chloroethane		ND		lene		ND	
447	Methylene chloride	••	ND		lene	•	ND	
297	1,1-dichloroethylen	e	ND		lene		ND	
137	1,1-dichloroethane		ND	Styr			ND	
307	1,2-trans-dichloroe	thylene	מא		opylbenzene		ND	
237	Chloroform	ND		larotoluene		ND ND		
100	1,2-dichloroethane		מא		ethyl Benzen	٩	ND	
117	1,1,1-trichloroetha	ND		chlorobenzen		ND		
6 V	Carbon tetrachlorid	ND		chlorobenzen		ND ND		
487	27 1,2-dichloropropane				tylbenzene	• , , ,	ND	
					chlorobenzen	ė	ND	
337	Trans-1,3-dichlorop	ropylene	ND		4-Trichlorob		ND	
877	Trichloroethylene	•	ND				, 110	
517	Dibromochloromethan	2	ND		•			
337	Cis-1,3-dichloroproproproproproproproproproproproprop	ylene	ND		•		•	
147	1,1,2-trichloroethan	1e	ND					
	Bromoform		סא		•	•		
157	1,1,2,2-tetrachloroe	thane	ND		. •		•	
85V	Tetrachloroethylene		ND	•		•		
77	Chlorobenzene		ND					
197	2-chloroethyl vinyl	ether	ND	•			•	

Trace concentrations detected below the average reporting limit.	Checked	by: N
Unknown Peaks 601 0 Unknown peaks 602 5 Concentration unknowns 601 ND Unknown concentration Unknown concentration based on average response factor.		18.000